ESO 1391

New Agricultural Commodities and Products
Promises and Pitfalls

by

Carl Zulauf
Assistant Professor
The Ohio State University

and

Norman Rask
Professor
The Ohio State University

October 1987

NEW AGRICULTURAL COMMODITIES AND PRODUCTS
PROMISES AND PITFALLS

Mounting agricultural surpluses are testimony to U.S. agriculture's excess production capacity. To cope with this problem, government farm programs idled 71 million acres or 18 percent of U.S. farmland during 1987 (U.S. Department of Agriculture, July 1987, p. 14). Despite increased government spending on farm programs, declining production has meant financial stress for farmers, agribusiness operators, and main street merchants in rural U.S.A. as resources exit agriculture for more profitable opportunities.

A more attractive option is to expand demand for agricultural commodities, thereby stimulating use of resources in agriculture and reducing farm program spending. Echoing this theme, a task force commissioned by the Secretary of Agriculture recently proposed the following goal: "To develop and commercialize within 25 years, an array of new farm and forest products, utilizing at least 150 million acres of productive capacity, to meet market needs representing net new demand for agriculture and forestry production" (New Farm and Forest Products Task Force, p. iii). Since U.S. exports have declined approximately one-third during the 1980s (U.S. Department of Agriculture, September 1987, p. 51) and since U.S. domestic food consumption basically increases at the rate of population growth, net new demand is increasingly interpreted as non-food demand. Recently, the Senate took a step in this direction by passing a bill which established a $75 million per year, 20-year program to develop alternative uses for surplus farm crops (Congressional Quarterly, Inc., p. 1765). These and similar efforts possess potential for broadening demand, but potential is always accompanied by pitfalls. These two subjects are discussed below.

Overview

Broadening demand for agricultural commodities is not a new idea. It is as old as low farm prices. The farm depression of 1920s and 1930s led to several attempts to develop new demand. Most, such as corn-based ethanol, failed (U.S. Department of Agriculture, August 1986, p. 3); but there was one big success: soybeans. The need for high protein feeds to satisfy a growing demand for meat by Americans caused soybean acreage to increase from 3 to 70 million between 1930 and 1980 (U.S. Department of Agriculture, 1972, p. 162, and 1986, p. 124). The hope of farm country U.S.A. is for a new "soybean."

There are basically two ways to broaden demand: new commodities and new products. To some extent these are interchangeable, but each is also distinct. **New commodities** refers to the introduction into the U.S. of plant and animal varieties currently cultivated in other parts of the world. **New products** refers to the development of new uses for agricultural commodities.

Promises

The main driving force behind new commodities is substitution for U.S. imports. For example, kenaf, an annual fiber crop not currently grown in the U.S., could supply newsprint (American Soybean Association, p. 3), approximately 70% of which is imported (U.S. Department of Commerce, p. 660). Historically, new commodities, such as the soybean, have been the major method used to broaden demand for agricultural commodities. Thus, new commodities bear close watching.

The immediate promise for new products rests primarily on exploiting existing non-food uses of agricultural commodities. Ethanol derived from corn is an octane enhancer in the U.S., while ethanol from sugar is a total fuel source in Brazil. Starch from corn is used in paper products, building material, textiles, adhesives, and other products (U.S. Department of Agriculture, May 1986, p. 14). Fats and oils are used in lubricants, plastics, and detergents, among others (U.S. Department of Agriculture, May 1983, p. 15). The problem with increasing market share of current non-food uses is that most compete directly against oil-based products. As oil prices have declined, competitiveness of agriculture-based products has declined. In addition, oil refiners have large, integrated facilities that create significant production advantages.

Greater potential appears to exist for using desireable properties possessed by commodity-based starches and oils to meet needs not currently met by oil-based products. For example, biodegradability of natural plastics could reduce waste disposal problems as well as dependence on oil imports. Other desireable properties include water absorption, adhesiveness, semipermeability, and viscosity (Muller, and Princen and Rothfus).

Industrial users of agricultural commodities view crops and livestock as factories programmed to produce specified types and amounts of starch, protein, and other chemicals. These components of agricultural commodities are separated or "cracked," much as petroleum is processed. This perspective, in combination with the control biotechnology offers over biological processes, suggests that molecular farming could be combined with traditional bulk farming. One commonly-noted example is programming

milk cows to produce antibiotics, which would be separated from the milk during processing.

Pitfalls

Potential pitfalls are numerous, but two seem especially noteworthy: complementarity and co-products. Complementarity refers to the fact that successful development of new commodities and products requires discovery of a complementary set of strategies and techniques: optimum production practices, efficient processing methods, coordinated marketing networks, not to mention saleable consumer products. Each provides roadblocks which require solutions that must be not only technologically but also economically and, increasingly, socially feasible. Time, money, and expertise--both scientific and managerial--are needed. Luck also helps. Furthermore, biotechnology and other emerging technologies suggest agriculture will not be the only source for new products. In short, economic competitiveness, not technological feasibility, determines whether new agricultural commodities and products succeed.

For the first time, biotechnology and other frontier technologies offer the potential to produce food using non-traditional methods or to significantly alter existing processing techniques. For example, instead of creating the final consumer product by chemically or mechanically processing a bulk food commodity, the final product could be constructed by "cracking" the bulk commodity into its constituent components and then building the final consumer product from the components. These possibilities suggest that traditional agriculture will need to produce an

economically competitive food product, or its traditional food market could be lost.

Co-product concerns reflect the fact that most non-food products will utilize only part of an agricultural commodity. For example, production of ethanol utilizes only the starch in the corn kernel. This leaves corn oil and protein co-products, which displace consumption of soybean oil and soybean meal by as much as 84% (Rask, Southgate, Walker, and Ott, p. 9). Corn farmers win, soybean farmers lose; and, consequently, net income of the farm sector increases substantially less than 100%. For farm sector profitability to improve 100%, new uses for corn oil and protein co-products of ethanol production would be needed. Thus, maximum benefits from new non-food products occur only when new uses are found for all, not just part, of an agricultural commodity.

Summary and Conclusions

New commodities and products offer a potential solution to agriculture's excess capacity. They could also reduce environmental contamination and lessen U.S. dependence on imported commodities. The key word is potential. Time, money, and expertise will be needed to address production, processing, marketing, and health concerns. This process could be shortened by legislating markets. For example, ethanol could be required as the substitute for lead as an octane enhancer. However, legislating demand rarely works. If cheaper alternatives exist, consumers or federal budget constraints will eventually succeed in deregulating demand. Agriculture is thus better served by directing its energy into developing market-competitive new commodities and products.

References

American Soybean Association. "Soybean Update." Volume 11, Number 27. July 13, 1987.

Congressional Quarterly, Inc. "Senate Passes Crop Research Bill." Congressional Quarterly Weekly Report. Washington, D.C. 45(1987): 1765.

Muller, H.G. "Some Physical Properties of Cereals and Their Products as Related to Potential Industrial Utilization." Industrial Uses of Cereals. Y. Pomeranz, editor. Symposium Proceedings held in conjunction with 58th Annual Meeting of American Association of Cereal Chemists, November 4-8, 1973. pp. 20-50.

New Farm and Forest Products Task Force. "New Farm and Forest Products: Responses to the Challenges and Opportunities Facing American Agriculture." Report to the Secretary, U.S. Department of Agriculture. Washington, D.C. June 25, 1987.

Princen, L.H. and J.A. Rothfus. "Development of New Crops for Industrial Raw Materials." Journal of the American Oil Chemists' Society. 61(1984): 281-289.

Rask, Norman, Douglas D. Southgate, Francis E. Walker, and Stephen L. Ott. "The Impacts of Fuel Alcohol Production on Ohio's Agricultural Sector." The Ohio State University, Ohio Agricultural Research and Development Center. Research Bulletin 1171. March 1985.

U.S. Department of Agriculture. Agricultural Statistics 1972. Washington, D.C. 1972.

U.S. Department of Agriculture, Economic Research Service. Agricultural Outlook. AO-132. July 1987.

U.S. Department of Agriculture, Economic Research Service. Agricultural Outlook. AO-134. September 1987.

U.S. Department of Agriculture, Economic Research Service. "Feed: Outlook and Situation Report." Washington, D.C. FdS-296. May 1986.

U.S. Department of Agriculture, Economic Research Service. "Oil Crops: Outlook and Situation Report." OCS-1, Washington, D.C. May 1983.

U.S. Department of Agriculture, Office of Energy. "Fuel Ethanol and Agriculture: An Economic Assessment." Agricultural Economic Report Number 562. Washington, D.C. August, 1986.

U.S. Department of Commerce, Bureau of the Census. Statistical Abstract of the United States - 1987. 107th edition. Washington, D.C. 1986.